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Anthropometrical and Physical Performance Profile of Ethiopian National League Soccer Players

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Abstract: ***The purposes of this study were to describe the anthropometrical and physical characteristics of Ethiopian national league male football players, find the differences in the anthropometric profile and physical performance between the players at different football positions. To achieve this purpose the following anthropometrical and physical variables were used; height, weight, BMI, vertical jump, Illinois agility test, Sit and reach test, fifty meter dash speed test. The result showed that there was statistically significant difference in the anthropometrical (Ht and Wt) and physical variables (sit and reach test, 50m dash run speed, vertical jump, and Illinois agility test) among the players in different playing positions. Present findings also showed that BMI of the groups were in the normal range and was no significant difference among playing positions. However, present study finding indicate in consistent with the most of the results so far done. Hence, the profile of the players could be possibly the result of many factors such as the genetics, diet; selection criteria in the talent identification and development, and training quality.***

Keywords: Anthropometry, physical performance, soccer

1. Introduction

Soccer in Ethiopia, like in the other countries of the world, it is a very popular and dominant sport throughout the country. The national team is selected from the players of the clubs based on their field performance. National football teams to be successful in the football competitions, the players need to possess sufficient physical, technical, tactical, and psychological qualities. Among the qualities that football players are demanded to have optimum anthropometrical and physical performance. Especially these days due to the development of football technology and industry, the anthropometrical and physical potentials is getting much attention in the soccer world. Many scholars and researchers have studied the anthropometrical and physical performance profile of different football players. Most of the studies indicate that players' anthropometrical and physical characteristics differ according to playing position (Reilly *T*, et al 2003; Johnathan Bloomfeild et al, 2007; Di Salvo *et al*, 2007; Spoirs et al 2009; Zalai D. et al, 2015;). In relation to playing position studies have been indicated that goal keepers as taller and heavier. On the other hand midfielders were found to have superior aerobic power than the goal keepers and the defensive, and attacking players. The attacker player had better anaerobic power than the rest (; Reilly T, et al 2000; Rienzi E. et al , 2000 ;Swapan K. Dey et al, 2010; Mehdi Ben Brahim et al, 2013).

However, in the case of Ethiopian footballers there is no much research done with regard to anthropometric and physical characteristics of the national level soccer players. Most of the concerned bodies in the area believe that comparing with the other successful national soccer teams the Ethiopian soccer players had poor anthropometry and physical profile. In fact the Ethiopian national team technical and tactical especially the passing skills and movements can be described as a better one. Therefore, for the development of soccer in the country in general and at national level in particular, the need to study the anthropometrical and physical performance of players was unquestionable.

Hence, the study of anthropometrical and physical performance of Ethiopian national league football teams can provide useful information for researchers, coaches, players and other concerned people know about the football teams and players. Furthermore, this information can be used to compare with the result of other successful football national team players and identify the weak and strong side of the players. This data is also help full to incorporate the knowledge of anthropometry and physical qualities in to the talent identification and development program of the country.

2. Objective of the Study

The present study entitled "Anthropometrical and physical performance profile of Ethiopian national league players" has been taken up to assess the health and motor skill related parameters of football players in relation to playing position.

3. Hypothesis

It is hypothesized that there might be significant differences in the selected anthropometrical and Physical performance variables among the playing positions.

4. Methodology

Subjects

Anthropometric characteristics and physical performance results of 90 players of the Ethiopian football national league team in 2014/15 team were participants of the study. For the purpose of this study, players were classified according to their playing position in to Goalkeepers

(GK=12), Defenders (D=27), Midfielders (M=33) and Attackers (A=18). The age category of the players was from 19-27 years.

Variables
The following anthropometrical and physical performance variables were used in this study; height, weight, Body Mass Index (BMI), vertical jump, Illinois agility test, Sit and reach test, and fifty meter dash speed test.

Instruments
The anthropometrical and physical variables were assessed using the following instruments. Stopwatches, Anthropometric rod, weighing machine, measuring tape, sit and reach box. The instruments were considered accurate enough for the objective of the study.

Procedures
The participants were informed about the objective and purpose of the study. Prior to administration of the tests, the researchers gave clear instruction to the subjects on how the test would be conducted. The players were also allowed to practice until they were familiar with the tests. In addition optimum motivation was given to the players during the testing time to perform their maximum level.

Statistical Analysis
In the first section descriptive analysis on the selected anthropometrical and physical variables were described in terms of mean, standard, minimum, and maximum. In the second part Analysis of variance was used to test significance of differences, if any, among the different playing positions. A Post hoc test (Tukey test) test was implemented to distinguish significance of differences between the paired means. The Statistical analysis was performed using SPSS version 20.0.

5. Results

In the first section descriptive analysis on the selected anthropometrical and physical variables were described in terms of mean, standard, minimum, and maximum. In the second part Analysis of variance was used to test significance of differences, if any, among the different playing positions. A Post hoc test (Tukey test) test was implemented to distinguish significance of differences between the paired means.

Descriptive statistics

In this section the descriptive statistics of all the players were described in the form of mean, standard deviation, minimum and maximum. The detail result is presented in table-1 below.

Table 1: Mean, standard deviation, minimum, and maximum values of the Anthropometrical and physiological characteristics of the players

Variables	N	Min.	Max.	Mean	SD
height of player(in cm)	90	161	180	171.05	±4.44
weight of player(in kg)	90	57.5	79.5	67.61	±5.29
body mass index	90	18.98	27.15	23.06	±1.87
SRT	90	4.5	19.1	11.99	±4.20
Speed 50m(in seconds	90	5.97	7.27	6.95	±.26
Vertical Jump (in cm)	90	36	62	50.74	±6.68
Illinois test (in sec.)	90	15.5	16.92	16.07	±.35

Table 1 showed the mean values of anthropometrical measures for all the 90 participants of the study. Hence, the mean values of the subjects height was 171.05 cm with standard deviation of ± 4.44, weight was 67.61kg with standard deviation of ± 5.54 and BMI was 23.06 ± with standard deviation of ±1.87. The minimum and maximum values for Anthropometrical variables of all the soccer players were: height (161.00 and 180 cm), weight (57.50; 79.00 kg), BMI (18.98; 27.15). Table 1 also revealed that the average values of all soccer players in selected physical fitness variables of sit and reach test, speed 50m, vertical jump, and Illinois test of Agility. The mean values of the subjects' in fifty meter dash was 6.95 seconds with standard deviation of ± 0.26, the vertical jump 50.74 with standard deviation of ± 6.68, the sit and reach test was 11.99 cm with standard deviation of ± 4.20 and Illinois test was 16.07 with standard deviation of ±.35. With regard to the minimum and maximum values for Physical fitness variables across all the soccer players were: seat and reach test (4.5; 19.10 cm), Fifty Meter Dash speed test (5.97; 7.27 m/s), Illinois test of Agility (15.50; 16.92 sec) and vertical jump test (36; 62cm).

Anthropometrical and physical performance characteristics according to playing positions

The main objective of this research was to examine the anthropometrical and physical performance fitness parameters among the group of players in relation to positional roles. To achieve this objective first descriptive statistics was implemented. Then Analysis of Variance (i.e. One Way ANOVA) was applied to observe significance difference among the groups. Moreover, to find out the paired mean difference where F-ratio was significant the post hoc test (Tukey HSD test) was employed. The detail of the results are presented in part I and II of this section

Anthropometrical and physical fitness variables according to playing position
The minimum, maximum, mean and standard deviation values for anthropometrical and physical performance variables were identified according the subjects positional roles. The results of the variables are presented in the table 2 below.

Table 2: Descriptive values of anthropometrical variables according to playing positions

Variables	Position	N	min	max	Mean	SD
Height (in centimeter)	GK	12	168.00	180.00	174.59	±3.52
	D	27	162.10	178.00	171.80	±3.80
	M	33	161.00	179.50	169.26	±4.87
	A	18	163.30	177.40	170.85	±3.52
Weight (In Kg)	GK	12	62.40	78.50	71.41	±6.36
	D	27	62.50	79.50	68.90	±5.45
	M	33	55.50	74.30	65.24	±4.64
	A	18	58.70	78.40	66.65	4.89
BMI	GK	12	21.3	25.65	23.39	1.52
	D	27	20.50	27.15	23.37	2.04
	M	33	18.98	27.11	22.82	2.03
	A	18	20.19	26.41	22.83	1.51

Table 2 showed that the anthropometrical variables of the subjects according to different playing positions. The mean values for the Goalkeepers height were 174.59cm with standard deviation of ± 3.52 for, 171.80cm with standard deviation of the ± 3.80 for defenders, 169.26cm with standard deviation of ± 4.87 for midfielders, and 170.85cm with standard deviation of± 3.52 for strikers. The mean and standard deviations values for the Goalkeepers weight were 71.41 kg with standard deviation of ± 6.36 for, 68.90 kg with standard deviation of the ± 5.45 for defenders, 65.24 with standard deviation of ± 4.64 for midfielders, and 66.65 kg with standard deviation of± 4.89 for strikers. The mean and standard deviation for age were (22.92 ± 3.06 for goalkeepers; 23.11±2.37 for defensive players; 23.58± 2.07 for midfielders and 22.39±2.00 for attackers).

Table 3: Mean, SD, Max. and Min. values for physical performance variables according to playing positions

Variables	Position	N	min	max	Mean	SD
SRT (in centimeter)	GK	12	12.40	19.00	16.13	+.2.14
	D	27	6.10	18.40	13.05	±3.93
	M	33	4.50	18.00	10.05	±3.61
	A	18	6.40	19.10	11.20	±4.39
Speed 50 dash (In m/s)	GK	12	7.26	6.79	7.06	±.14
	D	27	7.27	6.84	7.04	±.10
	M	33	7.22	6.10	6.96	±.20
	A	18	7.15	5.97	6.69	±.38
Illinois test of agility	GK	12	16.12	15.58	15.88	±.17
	D	27	16.92	15.98	16.41	±.37
(in seconds)	M	33	16.42	15.65	15.97	±.21
	A	18	16.14	15.50	15.83	±.21
Vertical jump (in cm)	GK	12	40.50	60.50	53.54	±6.62
	D	27	42.50	60.30	51.71	±5.77
	M	33	36.50	62.00	47.20	±6.60
	A	18	44.5	61.00	53.92	±5.46

Table 3 revealed the mean values of physical fitness variables of the subjects according to different playing positions. The mean values and SD of SRT for Goalkeepers, Defenders, Midfielders, and Attackers were (16.13±2.14; 13.05±3.93; 10.05±3.61; 11.20±4.39) respectively. The mean and SD of fifty meter speed test for Goalkeepers, Defender, Midfielders, and Attackers were (7.06±.14; 7.04±.19; 6.96±.2; 6.69±.39) respectively. Mean and standard deviation for the test Illinois were; Goalkeepers (15.88±.17), Defenders (16.41±.37), Midfielders (15.97±.21), Attackers (15.03±.21). The mean and SD of vertical jump were; for Goalkeepers (53.54±6.62), Defenders (51.71±5.77), Midfielders (47.20±6.60) and for Attackers (53.92±5.46).

ANOVA for the anthropometrical difference according to playing position

The results of Table 3 revealed that there were mean value differences among the different groups. In order to identify whether the observed mean differences were significant difference One Way ANOVA was used. The statistical result of those different positional groups is depicted in the table 4 below.

Table 4: Analysis of variance of the groups in relation to playing positions

Variables	Positional roles				F-test	P-value
	GK(Ẋ, SD)	**D** (Ẋ, SD)	**M**(Ẋ, SD)	**A**(Ẋ, SD)		
Ht	174.59 ±3.52	171.80±3.8	169.26±4.87	170±3.52	5.25	.002*
Wt	71.41±6.36	68.90±5.45	65.24±4.64	66.65±4.89	7.00	.000*
BMI	23.39±1.52	23.37±2.04	22. 82±2.03	22.83±1.51	.63	.595
SRT	16.13±2.14	13.05±3.93	10.05±3.6	11.20±4.37	8.89	.000*
50m dash	7.06±1.41	7.03±.10	6.97±.20	6.69±.38	9.83	.000*
Illinois test	15.88±.17	16.41±.37	15.98±.21	15.84±.21	22.33	.000*
VJ test	53.54±6.62	51.7±5.77	47.2±6.60	53.92	6.307	.001*

Significant at p< .05 levels

As we can see from table 4 there were a significant difference (p<0.05) in weight, height, Sit and Reach Test, Agility, 50m Speed test, and Vertical jump test. But in the case of BMI the difference was not significant (P>0.05) among the positional groups. To find out the paired mean difference where F-ratio was significant the post hoc test (Tukey HSD Test) was employed. The multiple comparison results of the paired mean difference is presented in table 4 as follow

Table 5: Multiple comparisons among the different playing positions

variables	GK Vs D (Sig.)	*GK* Vs M (Sig.)	GK Vs A (Sig.)	D Vs M (Sig.)	D Vs A (Sig.)	M Vs A (Sig.)
Wt	.133	.000*	.023*	.037*	.713	.551
Ht	.220	.001*	.081	.094	.876	.563
SRT	.890	.000*	.004*	.014*	.368	.718
50m dash	.983	.624	.000*	.623	.000*	.001*
Illinois test	.000*	.718	.973	.000*	.000*	.301
VJ test	.826	.015*	.998	.030*	.637	.002*

* Sig. <0.05

6. Discussion

The finding of the study showed that the anthropometrical and physical variables; weight, height, sit and reach test, 50m dash speed test, Illinois Agility Test, and vertical jump test had showed significant differences among the different playing position (Goalkeepers, Defenders, Midfielders, and Attackers).

It was evident from the result of the study that Goalkeepers were significantly heavier than the rest of the groups. Defensive players were also significantly heavier than the mid fielders. It was also revealed that Goalkeepers were significantly taller than the rest of the groups. But there was no significant difference in height among the rest of the groups. This is happened because most of the time coaches select heavier and taller goalkeepers so as to defend the goal.

In the case of flexibility test goalkeepers were performed significantly better than the midfielders and attackers. This may due to the fact that goalkeeper has a special role in the game. That means, unlike the other outfield players goalkeeper are allowed to play the ball with hands inside

their penalty area and routinely perform leaping, catching, dives kicking, charging and etc. so due to the nature of the goalkeeping the training given to goalkeepers is different than the outfield players. Hence, this may lead the goalkeepers to be more flexible than the rest of groups.

The result of the study revealed that attackers were significantly fastest than the rest of the groups. However, there was no significant difference in speed between the paired mean test of defenders and goalkeepers, between defenders and midfielders, and between midfielders and attackers

The analysis of the data showed that in case of Body Mass Index (BMI) there was no significant difference among the Goalkeepers, defenders, Midfielders, and attackers. It can be said that the groups had good BMI which can fall somewhere in the normal range category.

7. Conclusion

The result of the anthropometrical and physical characteristics of the players showed that there were a statistically difference among the different playing positions. This difference could be possibly the result of many factors such as the genetics, diet; selection criteria in the talent identification and development, training quality etc. present study suggest that concerned bodies in the area should take anthropometrical and physical demand of different positions in to account during talent identification and development programs.

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